

Two New *Epaphius* (Coleoptera, Trechinae) from the Kushiro Moor, Northeast Japan¹⁾

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Abstract A new species and a new subspecies of the trechine subgenus *Epaphius* are described from the Kushiro Moor in eastern Hokkaido, Northeast Japan. The new species, named *Trechus* (*Epaphius*) *pirica*, belongs to the group of *T. hashimotoi*, while the new subspecies, named *T. (E.) plutenkoi kushironis*, is regarded as an isolated insular form of a species originally described from the Russian Far East.

The Kushiro Moor, protected as a national park, is one of the largest low altitude moors now extant in the Japanese Islands. It lies near the Pacific coast at the eastern part of Hokkaido, the northernmost main island of Japan, and is well known for the existence of various hygrophilous animals, which are widely distributed in the circumpolar areas but whose occurrence in Japan is restricted to this national park. The Siberian salamander, *Salamandrella keyserlingii*, is the best example of this. Consequently, repeated faunal investigations have been made in the moor, and many reports have been published on the results. It was therefore most unexpected that two new trechine beetles still remained undiscovered in the moor until recently.

Late in the summer of 1990, Masataka SATÔ and Masahiro SAKAI visited the moor for investigating aquatic beetles. While collecting at the edges of an old canal covered with reeds, SATÔ found a trechine beetle floating on the water surface. Later examination proved that though it was a female, this trechine belonged to a species theretofore unrecorded from Japan and possibly new to science. Since the winter is long in eastern Hokkaido, additional specimens of the trechine beetle were sought in warmer seasons of the next year, and in this survey, NISHIKAWA collected another species of trechine beetle, which looked like a new member of the group of *Trechus hashimotoi*. On the other hand, KUBOTA who looked for larvae of donaciine chrysomelids, unexpectedly dug out a second specimen, male, of the first species from the sphagnum edge of a bog. And thus, two different species of unrecorded trechine beetles came to my hands at the same time from the Kushiro Moor.

In the summer of the same year, I had an opportunity to visit the Institute of Biology and Pedology at Vladivostok and to see the collection of ground beetles from the Russian Far East. It contained the type series of an *Epaphius* recently described by LAFER (1989, p. 142, fig. 87-2) under the name *E. plutenkoi*. One of the Kushiro

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trechines agreed with this species, though it was obviously larger than the continental examples and differed from the latter in several minor details. After a careful comparative study, I have come to the conclusion that they represent two geographical races of the same species.

In the present paper, I am going to introduce the two trechine beetles from the Kushiro Moor into science. The first species, which is fully winged, will be named *Trechus (Epaphius) plutenkoi kushironis*, and the second *T. (E.) pirica*. The abbreviations used herein are the same as those explained in previous papers of mine.

Before going further, I wish to express my indebtedness to Professor Masataka SATÔ, Professor Yoshiaki NISHIKAWA, and Messrs. Masato HINAKURA, Masahide KUBOTA, Akira NISHIYAMA and Minoru TAO for their kindness in submitting their collections to me for taxonomic study. Heartly thanks should also be expressed to Dr. G. Sh. LAFER of the Institute of Biology and Pedology, Vladivostok, for his kind collaboration in allowing me to examine the rich collection of the East Siberian Trechinae preserved in his Institute, and in giving our museum a paratype of *Epaphius plutenkoi*, which was indispensable for drawing the conclusion given in the present paper.

Trechus (Epaphius) plutenkoi kushironis S. UÉNO, subsp. nov.

(Figs. 1-3)

Length: 4.15-4.20 mm (from apical margin of clypeus to apices of elytra).

Distinguished from the nominotypical subspecies (LAFER, 1989, p. 142, fig. 87-2) from the Russian Far East by being larger, larger eyes, longer antennae, more obtuse hind angles and deeper basal foveae of pronotum.

Colour reddish brown with somewhat lighter and faintly iridescent elytra, shiny; palpi and legs yellowish brown. Fully winged.

Head small, transverse, with deep frontal furrows very obtusely subangulate at middle and widely divergent behind; frons gently convex, supraorbital areas depressed; microsculpture distinct, mostly consisting of isodiametric meshes; eyes fairly large and moderately convex; genae short, about two-fifths as long as eyes, and strongly convergent towards deep neck constriction; neck fairly wide; supraorbital pores situated on lines divergent behind, the anterior pair foveolate; labrum short, with the apical margin nearly straight at middle; mandibles stout though acutely hooked at the apices; mentum tooth rather small, with the tip obtusely bifid; palpi fairly slender though not long; antennae also fairly slender, reaching basal two-fifths of elytra in ♂, a little shorter than that in ♀, segment 2 the shortest, about 4/5 as long as one of the segments 3-10, which are subequal in length to one another though slightly dilated apicad, each about 3 times as long as wide, terminal segment the longest, longer but evidently narrower than scape.

Pronotum fairly large, transverse, widest at about three-fifths from base, and more strongly narrowed towards apex than towards base; PW/HW 1.33 in the holotype

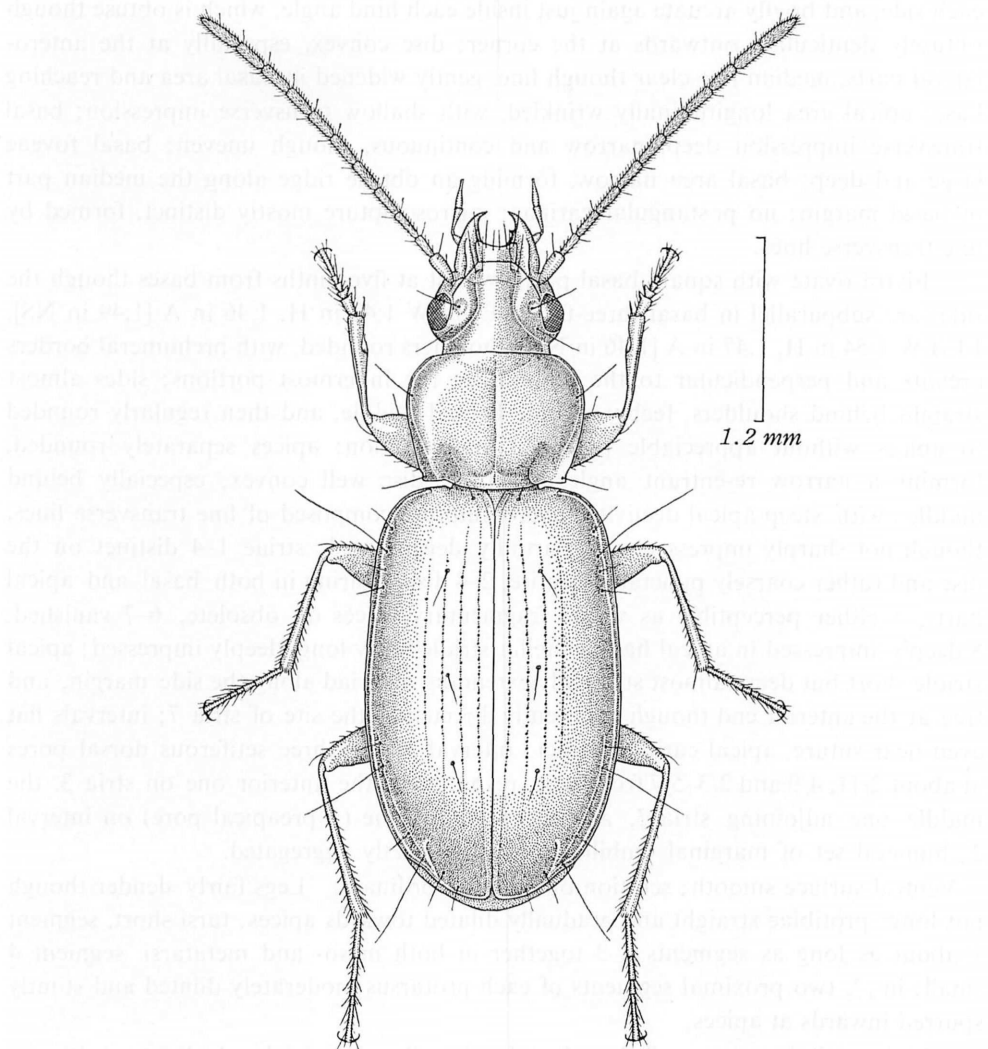


Fig. 1. *Trechus (Epaphius) plutenkoi kushironis* S. UÉNO, subsp. nov., ♂, from Aka-numa of the Kushiro Moor.

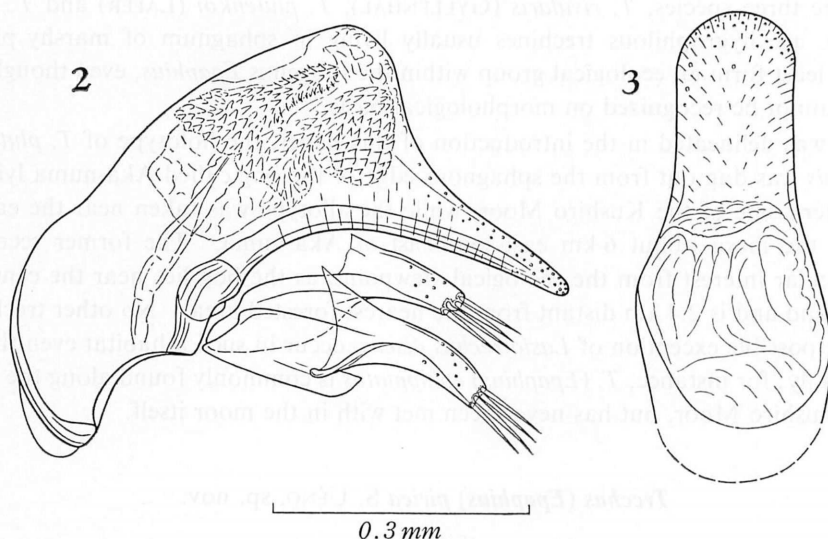
(H), 1.40 in the allotype (A) [1.36 in a paratype of the nominotypical subspecies (NS)], PW/PL 1.33 in H, 1.40 in A [1.41 in NS], PW/PA 1.52 in H, 1.53 in A [1.49 in NS], PW/PB 1.25 in H, 1.26 in A [1.25 in NS]; sides widely and rather strongly arcuate in front, more feebly so behind to hind angles and devoid of ante-basal sinuation, narrowly bordered in front but the borders become widened in basal third and widely reflexed near hind angles; apex slightly arcuate or bisinuate, with front angles rounded and not produced; base evidently wider than apex, PB/PA 1.22 in H, 1.21 in A [1.20 in NS], either straight or slightly arcuate at the median part, shallowly emarginate on

each side, and briefly arcuate again just inside each hind angle, which is obtuse though obtusely denticulate outwards at the corner; disc convex, especially at the antero-lateral parts, median line clear though fine, gently widened in basal area and reaching base; apical area longitudinally wrinkled, with shallow transverse impression; basal transverse impression deep, narrow and continuous, though uneven; basal foveae large and deep; basal area narrow, forming an obtuse ridge along the median part of basal margin; no postangular carinae; microsculpture mostly distinct, formed by fine transverse lines.

Elytra ovate with square basal parts, widest at five-ninths from bases though the sides are subparallel in basal three-fifths; EW/PW 1.43 in H, 1.46 in A [1.49 in NS], EL/EW 1.54 in H, 1.47 in A [1.46 in NS]; shoulders rounded, with prehumeral borders arcuate and perpendicular to the mid-line at the innermost portions; sides almost straight behind shoulders, feebly arcuate behind middle, and then regularly rounded to apices without appreciable preapical emargination; apices separately rounded, forming a narrow re-entrant angle at suture; disc well convex, especially behind middle, with steep apical declivity; microsculpture composed of fine transverse lines, though not sharply impressed and partially degenerated; striae 1–4 distinct on the disc and rather coarsely punctate, 1 entire, 2–4 disappearing in both basal and apical parts, 5 either perceptible as vague fragmentary traces or obsolete, 6–7 vanished, 8 deeply impressed in apical half; scutellar striole fairly long, deeply impressed; apical striole short but deep, almost straightly extending anteriad along the side margin, and free at the anterior end though apparently directed to the site of stria 7; intervals flat even near suture, apical carina distinct; interval 3 with three setiferous dorsal pores at about 2/11, 4/9 and 2/3–5/7 from base, respectively, the anterior one on stria 3, the middle one adjoining stria 3, and the posterior one (=preapical pore) on interval 3; humeral set of marginal umbilicate pores perfectly aggregated.

Ventral surface smooth; setation on sternites ordinary. Legs fairly slender though not long; protibiae straight and gradually dilated towards apices; tarsi short, segment 1 about as long as segments 2–3 together in both meso- and metatarsi, segment 4 small; in ♂, two proximal segments of each protarsus moderately dilated and stoutly spurred inwards at apices.

Male genital organ small though rather heavily sclerotized. Aedeagus only one-fourth as long as elytra, robust, about as high as wide, hardly arcuate in basal half but strongly bent behind middle, and straightly extending into apical lobe, which is very broad, parallel-sided and widely rounded at the apex in dorsal view, abruptly narrowed behind apical orifice and gradually tapered towards blunt apex in lateral view; apical orifice large and very steep, with lateral margins strongly convex in profile; basal part large and globular, with rather small basal orifice whose sides are moderately emarginate; sagittal aileron small and hyaline. Inner sac scaly in apical two-thirds, sclerotization of scales being mostly poor though partially moderate; no differentiated copulatory piece. Styles with lightly arcuate apical parts, left style obviously longer than the right, each bearing four short stout setae at the apex.



Figs. 2-3. Male genitalia of *Trechus (Epaphius) plutenkoi kushironis* S. UÉNO, subsp. nov., from Aka-numa of the Kushiro Moor; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

Type series. Holotype: ♂, Aka-numa, 27-VII-1991, M. KUBOTA leg. Allotype: ♀, Iwabokki, 26-VIII-1990, M. SATÔ leg. Both deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Kushiro Moor (Aka-numa in Tsurui-mura and Iwabokki in Kushiro-chô), in eastern Hokkaido, Northeast Japan.

Notes. It seems certain that the present trechine is conspecific with the continental one, since they are not only similar to each other in external morphology but have perfectly identical male genitalia. LAFER failed in describing the latter and besides, his description of external features is too concise as it was given in a key to the East Siberian species of the (sub)genus. I have examined the male genitalia of a paratype of *Epaphius plutenkoi* from Korfovskij in Khabarovskij Kray, and found that they are the same as those described and illustrated in this paper from the holotype of *T. (E.) plutenkoi kushironis*, except, of course, for the size, which is smaller than that of the latter in correlation with the difference in body size. Incidentally, the body length of the paratype examined is 3.65 mm from the apical margin of clypeus to the apices of elytra; LAFER's measurement (3.9-4.1 mm) seems to include mandibles, and therefore gives larger values than mine.

According to JEANNEL's classification (1962, p. 175), *T. plutenkoi* belongs to his subgenus *Epaphiolus*. However, as was suggested by myself (UÉNO, 1984, p. 139) and was suppressed by CASALE and LANEYRIE (1982, p. 79), this subgenus is not sharply defined in morphological features and cannot be maintained as a taxon. On the other

hand, the three species, *T. rivularis* (GYLLENHAL), *T. plutenkoi* (LAFER) and *T. sugai* S. UÉNO, are hygrophilous trechines usually living in sphagnum of marshy places. They at least form an ecological group within the subgenus *Epaphius*, even though this group cannot be recognized on morphological basis.

As was delineated in the introduction of this paper, the holotype of *T. plutenkoi kushironis* was dug out from the sphagnum edge of the bog called Aka-numa lying at the western side of the Kushiro Moor, while the allotype was taken near the eastern edge of the moor about 6 km east-southeast of Aka-numa. The former record is of particular interest from the ecological viewpoint, as the bog lies near the centre of the wetland and is 2.4 km distant from the nearest forested area. No other trechines, with the possible exception of *Lasiotrechus discus*, occur in such a habitat even though they can fly; for instance, *T. (Epaphius) ephippiatus* is commonly found along the edges of the Kushiro Moor, but has never been met with in the moor itself.

Trechus (Epaphius) pirica S. UÉNO, sp. nov.

(Figs. 4–6)

Length: 3.00–3.25 mm (from apical margin of clypeus to apices of elytra).

Closely similar in external morphology to *T. acco* S. UÉNO (1991, p. 107, figs. 2–3) from Mt. Shirikoma-daké in northern Hokkaido, but the pronotal sides are less strongly and less widely arcuate in front and more gradually convergent towards base, and the elytra are more elongate on an average and bear three distinct striae instead of four. Markedly different from the northern species in the configuration of male genitalia, especially of the left aedeagal wall and copulatory piece.

Colour as in *T. acco*, light reddish brown with paler appendages. Head as in *T. acco*, but the genae are shorter (one-fifth to one-third as long as eyes), hardly convex, and more rapidly constricted behind, and the antennae are a little longer, reaching basal two-sevenths of elytra even in ♀, with segments 7–10 each nearly 2.5 times as long as wide. Pronotum similar to that of *T. acco*, but the sides are more narrowly arcuate in front and more feebly so behind the widest part, with more obtuse hind angles; PW/HW 1.24–1.34 (M 1.29), PW/PL 1.36–1.47 (M 1.41), PW/PA 1.35–1.46 (M 1.42), PW/PB 1.21–1.28 (M 1.25), PB/PA 1.06–1.21 (M 1.13). Elytra usually more elongate than in *T. acco*, widest at about middle and a little more gradually narrowed towards bases than towards apices; EW/PW 1.43–1.52 (M 1.47), EL/EW 1.43–1.51 (M 1.47); sides more feebly arcuate before the middle and more narrowly rounded at apices than in *T. acco*; disc often depressed in basal two-thirds; striae 1–3 more or less distinct at least on the disc and clearly punctate, 1–2 usually entire and rather deeply impressed, 3 often shallower than the inner two and usually obsolete near base, 4 usually traceable though shallower than the inner and often fragmentary, 5 vestigial, sometimes perceptible only as a row of very fine punctures, 6–7 obsolete though sometimes represented by rows of microscopical punctures, 8 deeply impressed in apical half; scutellar and apical striae similar to those in *T. acco*; chaetotaxy as

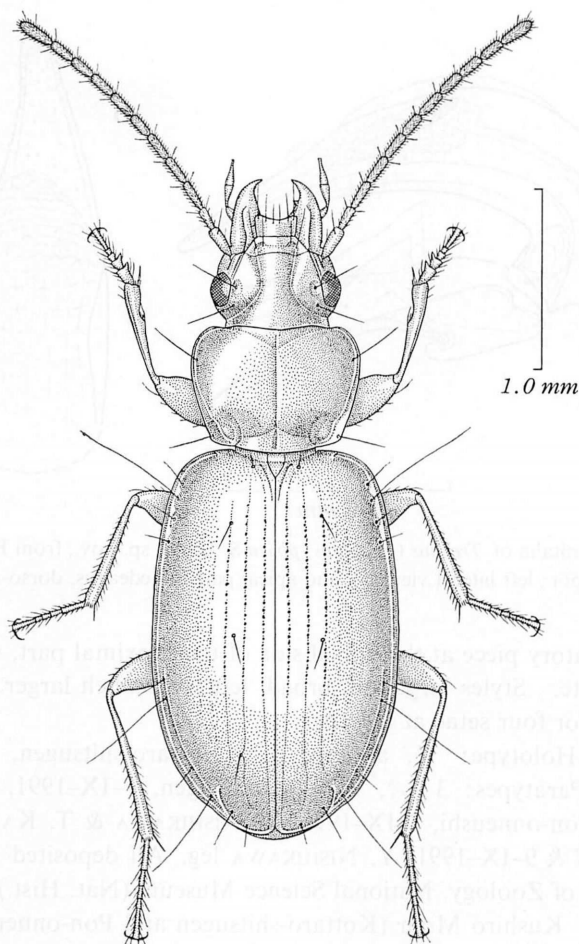
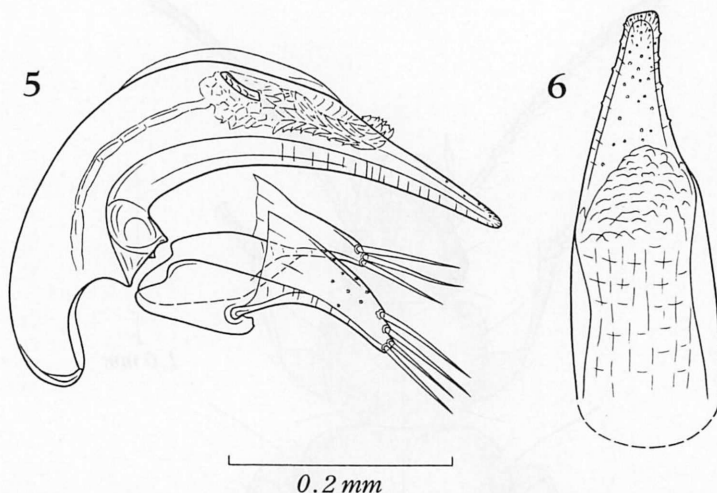


Fig. 4. *Trechus (Epaphius) pirica* S. UENO, sp. nov., ♂, from Kottaro-shitsugen of the Kushiro Moor.

in *T. acco*, though the preapical pore is sometimes missing. Ventral surface and legs as in *T. acco*.

Male genital organ small though moderately sclerotized except for the dorsal parts of aedeagal lateral walls. Aedeagus a little less than one-fourth as long as elytra, moderately depressed, strongly arcuate in basal half but only feebly so in apical half, with the dorsal margin semicircularly rounded in basal two-thirds in profile; dorsum widely open, membranous to above basal part, which is strongly bent ventrad and deeply emarginate at the sides of basal orifice; sagittal aileron absent; apical lobe long and almost straight, gradually narrowed towards apex, which is obliquely subtruncated in dorsal view and obtusely pointed in lateral view; left aedeagal wall not emarginate at the side of apical orifice; ventral margin widely emarginate at middle in profile. Inner sac covered with scales and teeth, which are not heavily sclerotized, and provided



Figs. 5–6. Male genitalia of *Trechus (Epaphius) pirica* S. UÉNO, sp. nov., from Pon-onneushi of the Kushiro Moor; left lateral view (5), and apical part of aedeagus, dorso-apical view (6).

with a small copulatory piece at the dorsal side of the proximal part, which is narrow and dorsally arcuate. Styles large and broad, left style much larger than the right, each bearing three or four setae at the apex.

Type series. Holotype: ♂, allotype: ♀, Kottaro-shitsugen, 7-IX-1991, Y. NISHIKAWA leg. Paratypes: 3 ♂♂, Kottaro-shitsugen, 7-IX-1991, Y. NISHIKAWA leg.; 2 ♂♂, 1 ♀, Pon-onneushi, 8-IX-1991, Y. NISHIKAWA & T. KAMURA leg.; 1 ♂, 3 ♀♀, Iwabokki, 7 & 9-IX-1991, Y. NISHIKAWA leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Kushiro Moor (Kottaro-shitsugen and Pon-onneushi by Tôro-ko in Shibeche-chô, and Iwabokki in Kushiro-chô), in eastern Hokkaido, Northeast Japan.

Further specimens examined. 1 ♀, Ochiishi, Nemuro-shi, 13-VIII-1988, M. HINAKURA leg. (found in a baited trap set by M. HINAKURA on 24-VII-1988) (NSMT); 3 ♀♀ (all teneral), Nakaonbetsu, Onbetsu-chô, 11-VII-1991, M. TAO leg. (NSMT).

Notes. It was most unexpected that a member of the group of *T. hashimotoi* did occur in eastern Hokkaido and what is more, in marshy places of the plains. As was demonstrated in a former paper of mine (UÉNO, 1991, pp. 105–106), all the four, previously known species of this group are localized in a narrow area stretching along the western side of northern Hokkaido. Two of them are alpine species, while the other two, which are restricted to the northernmost part, inhabit birch forests at slight elevations. At the southern side of their territory, *T. nakaguroi* of a different species-group is distributed from the Daisetsu Mountains in the west to the Shiretoko Peninsula in the east, and so far as has been known, it does not coexist with any species of the *hashimotoi* group. This means that the distributional range of *T. pirica*

is isolated from those of the other species of the same group.

Trechus pirica is also different from its relatives in its habitat. It is true that the trechine is in a way humicolous, since it lives under dead fallen reeds or dead leaves of other plants, but its occurrence is always in open marshy fields, not in dim shaded forest floors as in the case of the other species. On the other hand, it is not so highly hygrophilous as to become sphagnicolous, so that it does not penetrate deep into wetlands. Differing from many other paludicolous carabids, this trechine beetle is flightless and does not appear to have highly adapted to existence in seasonally flooded areas.

In the Kushiro Moor, *T. pirica* has so far been known only from three spots at the eastern side within a distance of 12 km. All lie near the sea-level; even the highest of the three, Kottaro-shitsugen, is only 8 m in altitude. The beetle lives among the roots of reeds, and can be found by sifting or drowning.

The specimen from Ochiishi, which is about 84 km east of the eastern edge of the Kushiro Moor, is slightly different from the type series in its broad hind body and relatively clear 4th stria of the elytra, but otherwise agrees well with the latter. It measures 3.05 mm in body length, and has the following standard ratios of body parts: PW/HW 1.34, PW/PL 1.45, PW/PA 1.45, PW/PB 1.31, PB/PA 1.11, EW/PW 1.49, EL/EW 1.36. Since all the known three are very teneral, it is impossible to take exact measurements of the specimens from Nakaonbetsu, which is about 29 km distant to the west-southwest from the southwestern corner of the Kushiro Moor. However, their body length measures 3.05–3.15 mm.

The specific name *pirica* is derived from “pirika,” which means pretty or lovely in the Ainu language.

要 約

上野俊一：釧路湿原産キイロチビゴミムシ亜属の1新種と1新亜種。——釧路湿原のゴミムシ相は、これまでにもしばしば調査されたが、固有のチビゴミムシが見つかったことはなかった。しかし、最近になって、日本から記録のない2種があいついで発見された。ともにキイロチビゴミムシ亜属 *Epaphius* の種で、一方は有翅、他方は無翅である。

有翅種は極端な好湿性で、ミズゴケのなかにすむ。ロシア極東地方の同じような環境に生息する、*Trechus (Epaphius) plutenkoi* (LAFER) によく一致するが、からだが大きいうえに若干の形態的差異も認められるので、その新亜種と認めて、クシロチビゴミムシ *T. (E.) plutenkoi kushironis* S. UÉNO と命名した。これまで採集されなかったのは、その特殊な生息環境のためだろう。有翅種でありながら分布が限られているのも、同じ理由によるものと思われる。

無翅種のほうは、これまで道北地方の西側のみから知られていたショカンベツチビゴミムシ種群に属する新種で、ピリカチビゴミムシ *T. (E.) pirica* S. UÉNO と命名し記載した。この種群のチビゴミムシ類は、高山帯や北海道の最北部で、カバ林の林床に生息することがわかっていたが、その一種であるピリカチビゴミムシが、ダイセツチビゴミムシの分布域によって隔離された太平洋側の地域に分布し、しかも開けた低湿地の、倒伏したアシの茎や枯れ葉の下などに生息することは、たいへん興味深い。

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The Staphylinid Beetles New y Recorded from Okushiri-tô Island, off Southwestern Hokkaido

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Only one species, *Paederus fuscipes* CURTIS, has hitherto been reported from Okushiri-tô Island, which is about 61 km distant to the southwest from the nearest coast of the Oshima Peninsula of Hokkaido. Through the courtesy of Mr. T. MAENAMI, three species of staphylinid beetles were given to me, all new to the fauna of this island, as recorded below. They were collected by Tetsuya MAENAMI at Tamaura of Okushiri-tô Island on July 12, 1964. I thank him for his kindness in giving me the specimens.

1. *Stenus* (*Stenus*) *alienus* SHARP, 1 ♂.
2. *Astenus suffusus* (SHARP), 1 ♀.
3. *Philonthus wuesthoffi* BERNHAUER, 1 ♀.